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FISH AND GAME DEPARTMENT

John R. Woodworth, Director

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BIOLOGICAL & ECONOMIC SURVEY OF FISHERY RESOURCES IN LAKE PEND
OREILLE
THE LAKE PEND OREILLE CREEL CENSUS AND LIFE HISTORY STUDIES, 1967

By

Jerry E. Mallet

Regional Fishery Biologist

Boise, Idaho
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TABLE OF CONTENTS

THE LAKE PEND OREILLE CREEL CENSUS AND LIFE HISTORY STUDIES, 1967

	<u>Page</u>
Abstract	1
Recommendations	2
Objectives	2
Techniques Used	3
Findings:	
Total Effort and Catch	3
Resident Sport Catch	5
Nonresident Sport Catch	5
Commercial Catch	5
Rates of Catch of Kokanee and Trout Fishermen	5
Kokanee Harvest by Year Class	12
Trout	16
Lamprey	17
Water Level Fluctuations	17

LIST OF TABLES

Table 1.	Total estimated utilization by all fishermen and their catch, Lake Pend Oreille, Idaho, 1967.....	4
Table 2.	Total estimated utilization by resident fishermen and their catch, Lake Pend Oreille, Idaho, 1967.....	6
Table 3.	Total estimated utilization by nonresident sport fishermen and their catch, Lake Pend Oreille, Idaho, 1967.....	7
Table 4.	Total estimated utilization by commercial fishermen and their catch, Lake Pend Oreille, Idaho, 1967.....	8
Table 5.	Catch data for interviewed angler (including commercial) seeking kokanee, Lake Pend Oreille, Idaho, 1967.....	9

TABLE OF CONTENTS, continued

		<u>Page</u>
Table 6.	Catch data for interviewed anglers seeking trout, all species combined, Lake Pend Oreille, Idaho, 1967	10
Table 7.	Catch data for interviewed anglers seeking Kamloops rainbow trout, Lake Pend Oreille, Idaho, 1967.....	11
Table 8.	Length-frequency distribution of 845 kokanee from the catch and 159 Kokanee from the spawning population, Lake Pend Oreille, Idaho, 1967	13
Table 9.	Estimated total catch of kokanee by year classes, Lake Pend Oreille, Idaho, 1967	15

THE LAKE PEND OREILLE CREEL CENSUS AND LIFE
HISTORY STUDIES, 1967

ABSTRACT

The 1967 creel census at Lake Pend Oreille was designed to determine the size and quality of the annual fish harvest and establish the catch by resident, nonresident, and commercial fishermen. The stratified sample was 9 percent of the estimated number of fishermen using the lake.

Creel census estimates for 1967 show that 55,909 anglers spent 251,845 hours to catch 908,293 fish. Approximately 77.6 percent of the fishermen were seeking kokanee, which made up 98.9 percent of the catch. About 21.6 percent sought trout, which comprised 0.5 percent of the catch, and 0.9 percent were after other species (perch, crappie, bass, whitefish, etc.) which comprised 0.5 percent of the catch.

Resident sport fishermen comprised 36.8 percent of the total fishermen, caught 24.8 percent of the total catch, and made 24.3 percent of the kokanee landings. Nonresident sport fishermen made up 56.3 percent of the total anglers, harvested 32.2 percent of the total catch, and took 32.2 percent of the kokanee catch. Commercial fishermen comprised 7.0 percent of the total anglers, harvested 43.0 percent of the total catch, and 43.4 percent of the kokanee catch.

Kokanee fishermen averaged 3.5 fish per hour, trout fishermen averaged 20.0 hours per trout, and Kamloops fishermen 33 hours per Kamloops.

Resident sport fishermen averaged 2.4, nonresidents 2.3, and commercial fishermen 16.3 fish per hour of effort.

Kokanee life history studies by the length-frequency and scale methods indicate: 70.29 percent, weighing 75.7 tons was from the 1962 year class; 24.8 percent, weighing 19.6 tons from the 1963 year class; and 4.9 percent, weighing 2.7 tons, from the 1964 year class.

Annual growth increments were 2.5, 1.6, and 0.9 for Age Groups II, III, and IV, respectively, and were determined from actual lengths.

The 1963 year class should contribute about average numbers to the 1968 catch with the 1964 year class may contribute slightly above average numbers. Kokanee fishing in 1968 should be above average.

RECOMMENDATIONS

It is recommended that the creel census program be continued on Lake Pend Oreille annually to gather information that can be utilized in management of this fishery.

It is recommended that all Kamloops planted in Pend Oreille Lake (with the exception of fingerlings) be marked to enable an evaluation of the relative contributions of hatchery and wild fish to the catch.

It is also recommended that efforts be made to pinpoint lamprey spawning areas in the Pend Oreille Lake system.

OBJECTIVES

A creel census has been conducted on Lake Pend Oreille since 1951 by the Idaho Fish and Game Department. Objectives of this 17-year census are:

- (1) to determine the size and quality of the catch of fish coincident with the construction and operation of Cabinet Gorge Dam on the major tributary and Albeni Falls Dam on the outlet; and
- (2) to gather information to be used in management of the fishery.

TECHNIQUES USED

The creel census sampling plan was similar to that used during the previous year. This plan called for a stratified sample to be taken from each of the seven census periods which extended through the fishing year (January 13 - November 30).

A total of 4,856 fishermen (approximately 9 percent of the total estimated number) were interviewed for creel data during the year. Approximately 99.6 percent of the fishermen leaving the lake through census areas on census days were contacted by a census clerk.

FINDINGS

Total Effort and Catch

Creel census estimates indicate that 55,909 anglers spent 251,845 hours to catch 908,293 fish in Pend Oreille Lake during 1967. The estimated catch included 898,748 kokanee, 3,349 rainbow, 788 cutthroat, 657 Dolly Varden, 70 mountain whitefish, 107 lake whitefish, 4,382 yellow perch, 14 black crappie, and 178 nongame fish (Table I).

The commercial season extended from January through May. During this period commercial anglers caught an estimated 390,242 kokanee.

Approximately 77.6 percent of the fishermen were seeking kokanee which made up 98.9 percent of the catch. About 21.6 percent sought trout which comprised 0.5 percent of the catch and 0.9 percent were after other species (perch, crappie, bass, whitefish, etc.) which comprised 0.5 percent of the catch.

Table 1. Total estimated utilization by all fishermen and their catch,
Lake Pend Oreille, Idaho, 1967.

Period	Men	Hours	Kokanee	Cut-throat	Dolly Varden	Rain-bow	Mtn. white-fish	Lake white-fish	Perch	Crappie	Large-mouth bass	Other game	Non-game
Jan. 13 - Feb. 27	2,078	11,679	125,435	---closed season---			--	--	--	--	--	--	--
Feb. 28 - Apr. 14	3,464	16,248	62,334	---closed season---			--	--	630	--	--	--	--
Apr. 15 - May 30	10,186	54,024	107,762	217	373	765	63	81	378	--	--	--	--
May 31 - July 15	16,066	67,561	358,366	366	98	1,454	--	26	27	7	--	--	166
July 16 - Aug. 30	10,488	40,389	73,220	75	84	506	--	--	7	7	--	--	12
Aug. 31 - Oct. 15	11,333	51,758	165,761	124	28	414	7	--	3,304	--	--	--	--
Oct. 16 - Nov. 30	2,294	10,186	5,870	6	74	210	--	--	36	--	--	--	--
Totals	55,909	251,845	898,748	788	657	3,349	70	107	4,382	14	--	--	178

Resident Sport Catch

Resident sport fishermen comprised 36.8 percent (20,564) of the total fishermen, caught 24.8 percent (225,339) of the catch, and made 24.3 percent (218,629) for the total kokanee landings (Table 2).

Nonresident Sport Catch

Nonresident sport anglers made up 56.3percent (31,457) of the total anglers, harvested 32.26 percent (292,698) of the total catch, and took 32.2 percent (289,877) of the kokanee catch (Table 3).

Commercial Catch

Commercial fishermen comprised 7.0 percent (3,888) of the total anglers, harvested 43.0 percent (390,256) of the total catch, and 43.49 percent (390,242) of the kokanee catch (Table 4).

Rates of Catch of Kokanee and Trout Fishermen

All fishermen combined averaged 3.6 fish per hour during the 1967 fishing season. Resident fishermen averaged 2.4, nonresidents 2.3, and commercial fishermen 16.3 fish per hour of effort.

An estimated 43,385 fishermen sought kokanee in 1967. Fishermen who fished specifically for kokanee averaged 3.5 kokanee per hour (Table 5). Commercial fishermen expended 9.5 percent of the effort in 1967 and averaged 16.3 kokanee per hour.

A total of 12,076 anglers sought trout in 1967. Trout fishermen averaged 20.05 hours per trout in 1967 while it required 33 hours to land a Kamloop (tables 6 and 7).

Average time fished was 4.6 hours for residents, 4.2 hours for nonresidents, and 6.2 hours for commercial fishermen.

Table 2. Total estimated utilization by resident sport fishermen and their catch, Lake Pend Oreille, Idaho, 1967.

Period	Men	Hours	Kokanee	Cut-throat	Dolly Varden	Rain-bow	Mtn. white-fish	Lake white-fish	Perch	Crappie	Large-mouth bass	Other game	Non-game
Jan. 13 - Feb. 27	972	5,025	29,751	---closed season---			--	--	--	--	--	--	--
Feb. 28 - Apr. 14	2,194	9,558	15,660	---closed season---			--	--	630	--	--	--	--
Apr. 15 - May 30	6,267	31,851	29,995	196	225	476	63	81	378	--	--	--	--
May 31 - July 15	5,065	22,683	84,846	96	89	302	--	7	7	7	--	--	166
July 16 - Aug. 30	1,700	6,086	11,347	--	12	199	--	--	--	7	--	--	12
Aug. 31 - Oct. 15	3,400	15,432	46,628	110	14	207	--	--	3,304	--	--	--	--
Oct. 16 - Nov. 30	966	4,512	402	6	74	76	--	--	36	--	--	--	--
Totals	20,564	95,147	218,629	408	344	1,260	63	88	4,355	14	--	--	178

Table 3. Total estimated utilization by non-resident sport fishermen and their catch, Lake Pend Oreille, Idaho, 1967.

Period	Men	Hours	Kokanee	Cut-throat	Dolly Varden	Rain-bow	Mtn. white-fish	Lake white-fish	Perch	Crappie	Large-mouth bass	Other game fish	Non-game fish
Jan. 13 - Feb. 27	298	1,533	7,601	---closed season---			--	--	--	--	--	--	--
Feb. 28 - Apr. 14	672	2,924	5,324	---closed season---			--	--	--	--	--	--	--
Apr. 15 - May 30	2,790	14,023	11,493	21	141	282	--	--	--	--	--	--	--
May 31 - July 15	9,648	37,915	78,985	270	79	1,152	--	19	20	--	--	--	--
July 16 - Aug. 30	8,788	34,303	61,873	75	72	307	--	--	7	--	--	--	--
Aug. 31 - Oct. 15	7,933	36,326	119,133	14	14	207	7	--	--	--	--	--	--
Oct. 16 - Nov. 30	1,328	5,674	5,468	--	--	134	--	--	--	--	--	--	--
Totals	31,457	132,698	298,877	380	306	2,082	7	19	27	--	--	--	--

Table 4. Total estimated utilization by commercial fishermen and their catch, Lake Pend Oreille, Idaho, 1967.

Period	Men	Hours	Kokanee	Rain- bow	Dolly Varden	Lake white- fish	Perch	Non- game
Jan. 13 - Feb. 27	808	5,121	88,083	--	--	--	--	--
Feb. 28 - Apr. 14	5981	3,766	41,350	--	--	--	--	--
Apr. 15 - May 30	1,129	8,150	66,274	7	7	--	--	--
May 31 - July 15	1,353	6,963	194,535	--	--	--	--	--
Totals	3,888	24,000	390,242	7	7	--	--	--

Table 5. Catch data for interviewed anglers (including commercial) seeking kokanee, Lake Pend Oreille, Idaho, 1967.

Month	Men	Hours	Kokanee	Other game fish	Kokanee per hour	All game fish per hour
January	39	206	1,956	--	9.5	9.5
February	165	866	6,744	--	7.8	7.8
March	226	1,085	4,149	--	3.8	3.8
April	208	925	1,176	--	1.3	1.3
May	535	2,972	16,532	31	5.6	5.6
June	526	2,206	5,303	46	2.4	2.4
July	638	2,446	4,919	64	2.0	2.0
August	556	2,232	5,106	28	2.3	2.3
September	584	2,688	8,685	33	3.2	3.2
October	287	1,280	4,800	16	3.8	3.8
November	2	6	--	--	0.0	0.0
Totals	3,766	16,912	59,370			
Average (weighted)					3.5	3.5

Table 6. Catch data for interviewed anglers seeking trout, all species combined, Lake Pend Oreille, Idaho, 1968.

Month	Men	Hours	Trout	Other game fish	Trout per hour	All game fish per hour
April	91	448	29	4	.06	.07
May	453	2,326	81	15	.03	.04
June	122	519	44	16	.08	.10
July	90	327	29	3	.09	.10
August	48	187	23	0	.12	.12
September	40	1572	20	6	.13	.17
October	61	240	9	0	.04	.04
November	145	735	18	0	.02	.02
Totals	1,050	4,939	253	44		
Average (weighted)					.05	.06

Table 7. Catch data for interviewed anglers seeking Kamloops rainbow trout, Lake Pend Oreille, Idaho, 1967.

Month	Men	Hours	Kamloops rainbow	Other trout	Other game fish	Kamloops rainbow per hour	Kamloops & other trout per hour	All game fish per hour
April	78	416	17	11	0	.041	.056	.067
May	392	2,037	18	18	9	.009	.018	.022
June	106	480	31	7	15	.064	.079	.110
July	76	280	15	1	0	.054	.057	.057
August	41	158	4	1	0	.025	.032	.032
September	33	127	10	2	6	.079	.094	.142
October	56	218	6	0	0	.028	.028	.028
November	143	731	16	1	0	.022	.023	.022
Totals	925	4,447	117	41	30			
Average (weighted)						.026	.036	.048

Kokanee Harvest by Year Class

In order to determine the age and growth characteristics of kokanee in the 1967 fishery, 1,004 were measured at periodic intervals throughout the year (Table 8). When these lengths are plotted, the distribution generally indicates the size range for each age class and their relative contribution to the fishery. Age analysis by scale reading is used to verify the length-frequency indications.

The kokanee catch is made up largely of nine to eleven inch kokanee (Age Groups III and IV) although large numbers of small fish are present in the lake. Age Groups 0 and I are difficult to collect in the lake due to their small size. The only practical method of obtaining this size of fish has been to sample with explosives. This has been carried on each summer during early June since 1960 and gives some indication of annual growth for each age class. A sample was collected on June 15, 1967 and is included with previous information below.

Table 8. Length-frequency distribution of 845 kokanee from the catch and 159 kokanee from the spawning population, Lake Pend Oreille, Idaho, 1967.

Length group (mm)	1967 Creel Census						1967 Spawners	
	1/13-2/27	2 28-4/14	4/15-5/30	5/31-7/15	7/16-8/30	8/31-10/15	Females	Males
170-4				4				
175-9				3	1			
180-4		1		7	1			
185-9		2		2	2			
190-4	2	3		3	5			
195-9	6	4	1	1	1	1		
200-4	9	5	3	9	2	2		
205-9	26	6	6	11	2	1		
210-4	39	14	11	32	3	2		
215-9	26	10	9	30	6	2		
220-4	28	9	7	34	11	5		
225-9	39	4	8	21	13	3		
230-4	18	5	6	33	15	2	1	
235-9	19		7	19	9	2	1	
240-4	9	3	4	16	20	6	4	1
245-9	2		4	8	21	9	13	1
250-4		1	2	3	12	12	20	5
255-9			1	3	3	12	26	7
260-4		3	1	1	6	8	10	15
265-9		2	1		5	5	5	21
270-4		10			2	5		21
275-9	1				1	2		3
280-4		2			4			4
285-9					1	1		1

Date of Sampling	Age Group I	Age Group II	Age Group III	Age Group IV
June 2, 1960	3.3 in.	6.2 in.	8.3 in.	9.3 in.
June 5, 1961	3.9 in.	7.0 in.	9.0 in.	10.0 in.
June 4, 1962	4.0 in.	6.8 in.	8.8 in.	10.0 in.
June 13, 1963	4.0 in.	6.8 in.	8.6 in.	9.7 in.
June 23, 1964	-	6.6 in.	8.4 in.	9.4 in.
June 8, 1965	4.3 in.	7.0 in.	8.1 in.	9.1 in.
June 7, 1966	4.3 in.	6.9 in.	8.3 in.	9.2 in.
June 15, 1967	3.6 in.	6.8 in.	8.5 in.	9.2 in.

Annual increments of growth were 2.5, 1.6, and 0.9 for Age Groups II, III and IV, respectively during the June, 1966 to June, 1967 period.

The 1967 harvest was predominantly from the 1962 year class (progeny of egg deposited in November and December, 1962) with about 29.8 percent of the catch coming from Year Classes 1963 and 1964. Kokanee from the 1962 year class (Age Group IV) comprised about 70.2 percent of the fishery and grew about 1.7 inches during the calendar year. The 1963 year class made up 24.5 percent of the harvest. Kokanee of the 1964 year class did not enter the fishery in large numbers until mid-summer and then comprised 4.9 percent of the 1967 harvest.

The 1962 year class made up 77.6 percent (75.7 tons); the 1963 year class, 19.1 percent (19.6 tons), and the 1964 year class 2.8 percent (2.7 tons) of the total poundage (Table 9).

The information collected by dynamite sample and age composition of the 1967 catch indicates the relative strength of the year classes that will provide

Table 9. Estimated total catch of kokanee by year classes, Lake Pend Oreille, Idaho, 1967.

Period	Estimated number of kokanee caught	1962			1963			1964		
		Percent	Number	Pounds	Percent	Number	Pounds	Percent	Number	Pounds
Jan. 13 - Feb. 27	125,435	80.4	100,850	20,170	19.2	24,084	3,733	0.0	--	--
Feb. 28 - Apr. 14	62,344	75.0	46,758	11,222	25.02	15,586	2,182	0.0	--	--
Apr. 15 - May 30	107,762	70.4	75,864	16,690	29.6	31,898	5,104	0.0	--	--
May 31 - July 15	358,366	63.8	228,638	50,300	27.9	99,984	16,997	8.3	29,744	3,271
July 16 - Aug. 30	73,220	63.7	46,641	13,059	28.1	20,575	4,115	8.2	6,004	780
Aug. 31 - Oct. 15	165,761	77.5	128,465	38,540	17.5	29,008	5,802	5.0	8,288	1,243
Oct. 16 - Nov. 30	5,870	71.8	4,215	1,433	24.0	1,409	310	4.2	246	42
Total number	898,748		631,431			222,544			44,282	
Total pounds				151,414			38,243			5,336
Percent of total number (weighted)		70.2			24.8			4.9		

the fishable population during 1968. The 1963 year class is about average or slightly below (comprised 1.5 percent of the catch as Age Class II compared to an average of 4.6 percent in the previous five years and contributed 24.8 percent as Age Class III compared to an average of 24.0 for the previous five year period).

The 1964 year class may be slightly above average (having contributed 4.9 percent of the catch as Age Class II compared to an average of 2.6 percent for the previous five years).

Indications are that the kokanee harvest for 1968 should be about average.

Trout

All trout that were observed during the creel census work were measured. These measurements presented a representative sample of the size of trout caught from Pend Oreille Lake. Cutthroat trout lengths range from 8 to 16.5 inches and averaged 12.2 inches. Dolly Varden ranged from 9 to 33 inches, averaging 18.6 inches while Kamloop varied from 6 to 36 inches in the creel and averaged 14.6 inches.

Approximately 12,076 anglers sought trout in 1967. An average of 20 hours was required to boat a trout during the year. The number of Kamloops caught during 1967 was 3,349 with 22.9 percent (767) of these Kamloops being trophy-size fish. The catch rate for Kamloop during 1967 was 33 hours per fish.

The catch of Dolly Varden in 1967 was the lowest on record 657.

Trout fishing in Pend Oreille Lake during 1967 was below average. A portion of the reduction was caused by reduced access to the lake during the late season due to low water which made boat ramp use impossible on the north end of the lake.

Lamprey

Lamprey were discovered in Pend Oreille Lake during the 1966 season. Two lamprey were found and turned over to the Fish and Game Department for examination that year. The initial lamprey was attached to a kokanee taken during the third week of March. The other was taken in November attached to a trophy-size Kamloop.

In 1967 there were three lamprey reported -- one taken from a kokanee, one from a Kamloop, and one snagged while fishing; for Kamloop.

In no case was the lamprey in excess of 7 inches in length. Tentative identification lists this lamprey as Lampetra fluviatilis (Linnaeus). This is commonly referred to as the river lamprey or lake lamprey.

The origin of the lamprey in Pend Oreille Lake is unknown as is the status of the population or its impact on the fisheries of Pend Oreille Lake.

An effort should be made during 1968 to locate lamprey spawning areas.

Water Level Fluctuation

In recent years the Corps of Engineers has fluctuated the water level of Pend Oreille lake considerably.

Major concern has been for fluctuations subsequent to kokanee spawning, thus dewatering eggs and causing resultant mortalities. This, is of course a major problem in lakes such as Pend Oreille Lake where the greatest majority of spawning occurs in lakeshore areas. However, at least two other areas have been affected and should receive increasing attention.

During the fall of 1967 the water level of Pend Oreille Lake was dropped considerably prior to the termination of the fishing season. The affect was to make most of the launching ramps in the north end of the lake unusable during

the later portion of the fishing season when fishing for trophy-size fish is generally best. The result was a decrease in pressure and resultant decrease in catch.

The other obvious affect has been the quality of bass fishing and limited access to prime spawning grounds by this species. Areas such as Denton Slough and the mouth of Pack River are prime bass spawning and fishing areas. When the lake is drawn down severely these areas are largely dried up. When this persists throughout the month of April, it eliminates fishing in these areas and delays bass spawning in years that temperatures would normally have permitted it at this time.

Fluctuations during periods of good fishing may or may not affect the continuity of this angling. No information is presently available on this matter.